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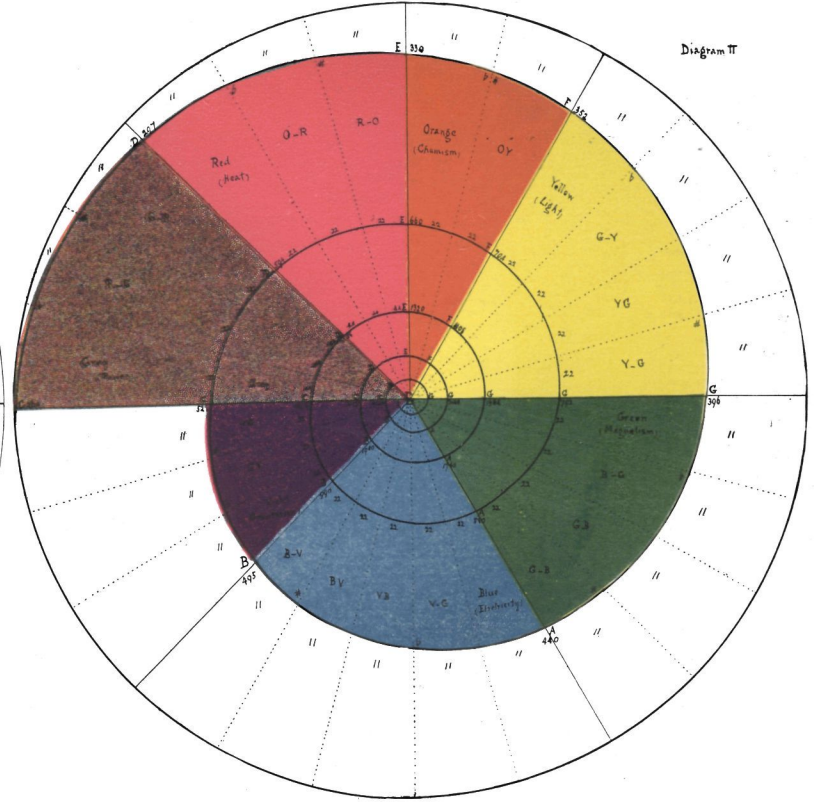
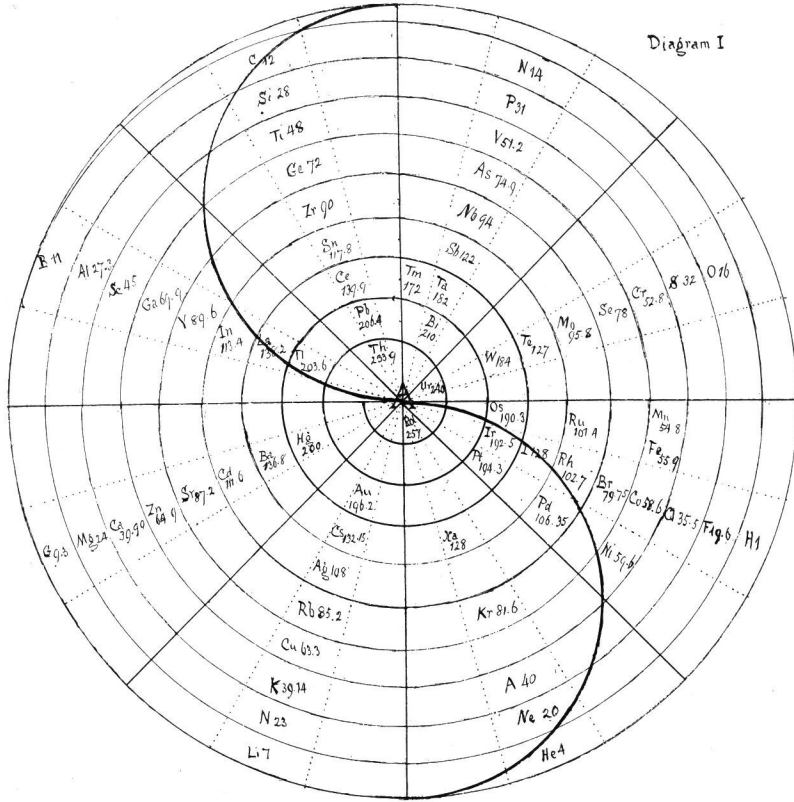
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Purple in the colored diagrams corresponds to
“gray” in the text.

VORTEX PHILOSOPHY

OR

THE GEOMETRY OF SCIENCE

DIAGRAMMATICALLY ILLUSTRATED

Charles S. Hamilton
BY
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CHICAGO

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1907

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PREFACE.

SOME explanation should be given of the origin and form of the present work. In the year 1892, I was introduced to a gentleman, Mr. J. J. Van Nostrand, a member of the Chicago Board of Trade, whose bent of mind had led him to study the nature of "speculation." He was greatly interested in this subject, and after some years of inquiry and consideration there was formulated in his mind a system of philosophy, formulæ of which he published from time to time. In its latest form, it appeared in 1903, under the title of "An Explanation of a Mechanical Philosophy," its illustrative diagram being headed "Sematology, a Natural Logic."

For some months after my introduction to Mr. Van Nostrand, I had much discussion with him on the topics he had under examination, and in 1893 I began an independent investigation into the physical aspects of natural activity. The scope of this enquiry gradually widened, until finally it embraced the organic as well as the inorganic, the phenomena of which were seen to be intimately allied, and to be expressions on different planes of a common activity, vortex motion. On showing to a professor of philosophy at the University of Chicago, a mechanical contrivance in illustration of the conclusion I had arrived at, he exclaimed, on seeing it revolve: "Why, that is vortex motion;" to which I replied: "Yes, it is intended to be."

The scientific principles embodied in the system thus worked out, were explained in a manuscript of more than six hundred pages; but unfortunately, a few years ago, this and all my other manuscripts with many diagrams were accidentally burned, and thus the work of ten years was

destroyed, with the exception of a book of diagrams which I had compiled and which I had the good fortune to save from the flames. My subsequent engagements did not permit of the reproduction of the lost work, so finally I resolved to make use of the most important diagrams I had saved, and state the principles on which they were based in the form of a series of propositions. The result is seen in the present work, the first thirteen propositions of which and the four first diagrams were printed separately in 1904, for private circulation, under the title of "The Geometry of Science."

I am well aware that the publication of a work of this kind, without giving the scientific data on which the conclusions embodied in its propositions are based, is not altogether satisfactory. It must be remembered, however, that this work is not addressed to the general reader, it being intended for those who are acquainted with the theory of evolution, of which it may be considered a study and an application, and with the general results of the discoveries of modern science. Moreover, it is very improbable that I shall again have the opportunity of bringing together and collaborating the numerous facts which would have to be referred to in a work dealing with those data. Nevertheless, I still hope to be able to embody in proper form many of these facts and the conclusions, inferential and speculative, to which I have been led in the course of my inquiry.

It is difficult to say how far I have been indebted for the contents of these propositions to the writings of Spencer, Hegel and other philosophers. In my discussions with Mr. Van Nostrand, he covered pretty nearly the whole ground of philosophic speculation, and probably I am indebted, directly, more to him than to any single writer. A certain similarity in matter, form and method between this work and his "Mechanical Philosophy" will thus be accounted for. But the two are quite independent, and so far as I can judge from personal explanations I have had the privilege

of receiving from Mr. Van Nostrand, the system for which he is responsible belongs to a category of its own, dealing with the world of signs and being purely "logical," in the sense of being concerned only with thoughts and their verbal and other symbols as embodiments and expressions of truth ; and being, therefore, so far as I can judge, supplementary to the systemization of physical and organic phenomena I have endeavored to make and to illustrate diagrammatically. Unless it may be regarded, in accordance with M. Ribot's views, as a representation of the organized knowledge of the subconscious factor of the mental constitution.

I may add, however, that I am wholly responsible for the general scheme of the vortex and cubic systems here developed and for its elemental, physiological and formal divisions. For some of the terms of the second of these divisions I have laid Professor Ernst Haeckel under contribution, and I am indebted to Professor Josiah Royce's Psychology for some of the terms employed in the psychical province.

CHICAGO, 1906.

INTRODUCTION.

EVOLUTION, which is a general term implying a dual operation, is a process of constant "refinement," a process by which things, in whole or part, are not only made smaller, but are made less gross or material. This is effected in the living organism by the breaking down of old material and its rebuilding with finer material. The smaller the particle the greater its vibration, or the smaller the wave the more rapid its undulatory motion. Similarly, the greater the compression of a body, the more active is the emission of the substance confined within its pores; as in the case of radium, thorium and other elements which have the greatest atomic weight, and lie, therefore, near the center of the elemental vortex.

In the system elaborated in the following pages the chemical elements form a closely related whole, in accordance with the law of periodicity, constituting a vortex, through the segmental action of which on the primal substance, and its subsequent integrating process, the elements have been formed; that is, the foundation particles being all alike, their combination in different proportions, and probably at different temperatures, has resulted in the formation of the elements as known to us. Taking the primal substance to have been ethereal, and assuming that only a portion of the substance was used in the formation of the elements, these probably took up or "occluded" in the course of their formation a certain proportion of free ether; which would thus not only form the basis of matter, but would also take an active part in the changes it would have to undergo through further segmentation and integration. In fact, all motory factors, such as the several "modes of

motion," are combined with ethereal activity, which is the real source and active agent in "evolution," as its material conjunct is the subject of the accompanying process of "involution."

The universality of vortex motion is required by the evident vortex relations of the modes of motion, as set forth in diagram XI of this work. For the physical, like the elemental, factors lie at the basis of natural phenomena, organic as well as inorganic, and all evolution proceeds along the lines already laid down by them. If the relations presented in diagram XI are just, then the interrelations of the modes of motion—by "modes" being meant the molar, atomic and molecular condition under which motion takes place—must be vortical; as all the atomic and molecular activities are phases of the molar activities light (radiation) and gravitation (concentration), these being the negative and positive aspects, or disintegrating and integrating activities of the central power; which for our system resides in the solar vortex that occupies its center. The living human organism and, therefore, every organism which has appeared from time to time in the process of terrestrial evolution, is a seat of vortical activity. Vital action lies at the root of mental activity of all kinds, and this also must be regarded as vortical, the mind constituting a vortex on the psychical plane. This is equally true of the logical mind or faculty, to whose operation man owes his superiority over the animal world, all its processes being those of true vortex activity; the result in every stage of the process of evolution being the "refinement" in which real progress consists. This refinement has proceeded so far in mental operations that pure symbolism has taken the place of images as instruments of thought; supported, however, as pointed out by M. Ribot, by the "latent, potential, organized knowledge" of the subconscious.

The ultimate refinement, however, is what is spoken of as "spiritual," which is thus seen to be intimately allied with

the material. Nevertheless, we shall probably find that what is first is also last, and that the ethereal and the spiritual are fundamentally the same. But, as nothing can go through such a process as that of "evolution" without undergoing great modification, the ethereal factor which ultimately appears as the spiritual must differ profoundly from that which at first gave birth, through segmentation and integration, to the material elements. Perhaps here we may hope to find the solution of the problem as to the nature of the "divine" principle which pervades the cosmos. To me, the existence of an overruling activity in nature, emergent, if not primeval, to which the name "deity" may be properly applied is reasonably certain, and I do not see why it should not come within the range of mathematical proof.

PART I.

PRELIMINARY PROPOSITIONS.

1. The totality of nature is a vast vortex, each solar system within it being a sub-vortex ; and everything in nature is vortical in operation, or partakes of vortical activity.

2. Diagrams I and II (see Frontispiece) represent the two complementary halves of a sphere of nebulous matter, the centers of the figures corresponding to the poles, which form the terminations of an axis passing through the center of the sphere ; the figure in diagram I being the hemisphere in which energy, that is radiative differentiation (segmentation) is predominant, and the figure in diagram II the hemisphere in which force, that is concentrative integration is predominant.

3. Energy, as radiative, is exterior activity and answers to motion ; force, as concentrative, is interior activity and answers to matter. Matter and motion cannot exist apart, and therefore force and energy always co-operate, as complementary opposites ; as may be illustrated by the twofold division of the circle in diagram I, which forms the yan and yin symbols of Chinese philosophy, standing for the negative and positive, or male and female activities, of nature. Such a co-operation is exhibited in the movement of the pendulum, where "push" in one direction is persistently opposed and is finally overcome by "pull" in the opposite direction.

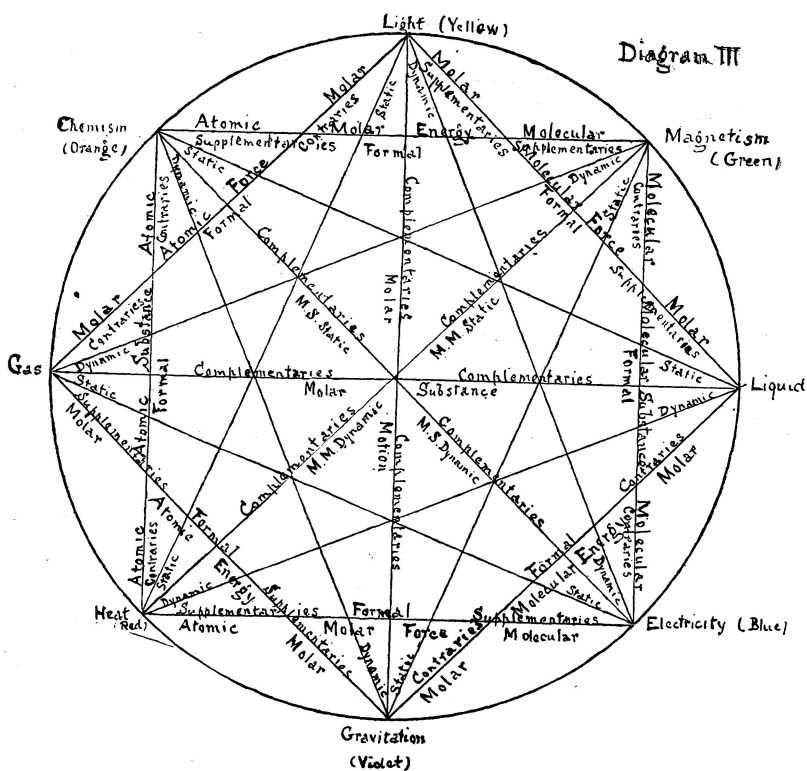
4. Energy may be supposed to radiate from the center of the sphere along its axis to the pole A (diagram I), which may be termed negative, and thence, under conditions of

temperature constantly varying, to pass spirally around the hemisphere, intersecting vertical lines of segmentation and thus forming nodes at which the chemical elements are deposited. Where the radiative principle is predominant such elements exhibit negative properties, and where the concentrative principle is predominant they exhibit positive properties. The elements nearest the polar center, although having the greatest radiative activity, have the highest atomic weight, the reverse being the case at the equator.

5. The application of the spiral numerical arrangement to the atomic weights of the elements shows, that these are governed in their periodic relations by the principle of segmental differentiation, although they do not exhibit actual arithmetical progression. Moreover, in the arrangement of the elements according to the law of periodicity in spiral formation, the elements which furnish the radial octaves will be found to have among themselves, approximately, the numerical relation marked by the first six powers of two, or their polar opposites, as exhibited in diagram IV.

6. On the principle of pendular motion, reaction will take place when the equator of the sphere is reached (see Proposition 3). Radiation will then give place to concentration towards the pole (B) of the other hemisphere, along the curves of a geometrical spiral, as shown in diagram II; and, under proper conditions of temperature, integration will give rise to combinations among the elements, forming first the gases, vapors, fluids and crystallizations of which a terrestrial globe consists. Further integrations will then give rise to the simplest organic forms, which by differentiation and still further integration will undergo modification, giving rise gradually to plants, animals and finally to man, who approaches the nearest to the pole of concentration, (which may be termed positive).

7. The passage of concentrative integration from the equator to the positive pole can be represented by a spiral, the



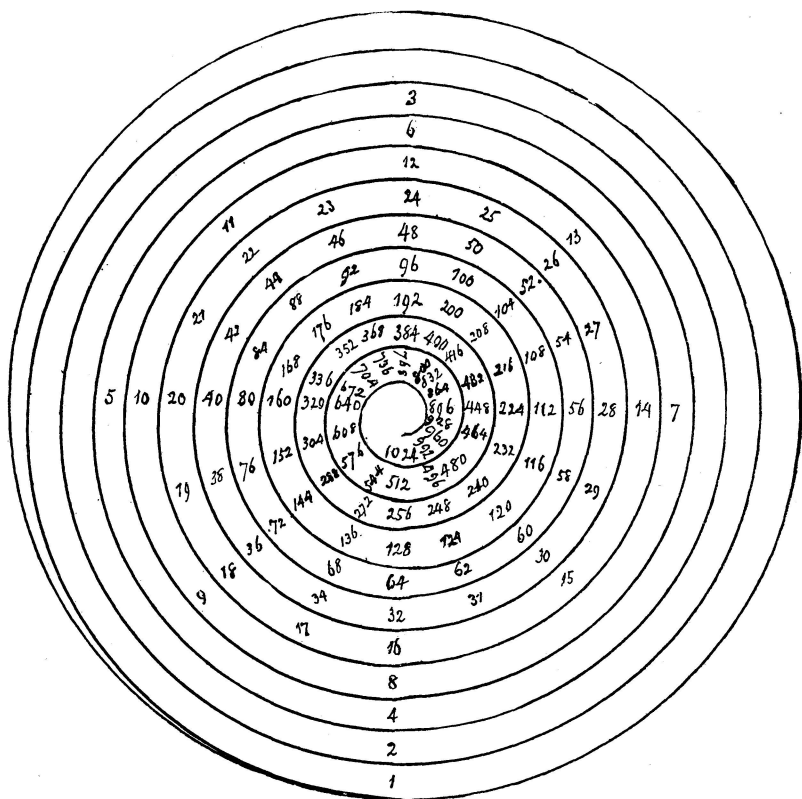


Diagram
IV.

curves of which give arithmetical progression, and the radii of which give geometrical progression; as shown by the vibration frequencies of the tones of the musical scale and their octaves marked on diagram II.

8. Arithmetical and geometrical progression are shown by the circular table of numerals given in diagram IV, which exhibits also the principle of radiation by segmental differentiation, each of the powers of 2 denoting the number of segments into which the curve it commands is to be divided. The initial number of each series of numerals is odd, which agrees with the fact that segmentation is due to the action of energy; even numbers representing force.

9. The staff showing the intervals of the musical scale requires to be divided into twenty-four equal parts, so as to exhibit the proportional vibration frequencies of the several notes of the scale; and, as the frequency of any note is double that of the same note in the octave next below, and half of the frequency of such note in the next octave above, if the staff be arranged in the spiral form given in diagram II, the octaves of C and of the other notes of the scale necessarily exhibit geometrical progression. With the vibration number of 264 assigned to C of the middle octave on the piano, the vibration frequencies of all the notes of the scale are divisible by eleven, or by some divisor of eleven equal to the value of the twenty-fourth part of the musical staff in any particular octave, and hence such frequencies give arithmetical progression along the curve. Moreover, the upper partials of C show arithmetical progression by steps of sixty-six vibrations per second, and if they are arranged in spiral form they exhibit geometrical progression from one octave to another.

10. Radiation is a property of molar energy (light) and its phases are perceived through the eye, chiefly by means of the rays of color, which rays are associated with the modes of motion. Concentration is the property of molar force (gravitation) and its phases are perceived through the

ear, chiefly by means of sound, as musical tones, which tones are associated with particular geometrical forms.

11. As exhibited in diagram II. An analogy subsists between the notes of the diatonic scale, which form a group or *socius* of musical tones (sound), and the color rays of the solar spectrum, which form, as a beam of light, a luminous *socius*; except that C, which is the opening note of the scale, answers to the invisible rays which exist between the red and the violet ends of the spectrum, and therefore should be represented by the mixed color gray. Further, the full tones of the enharmonic scale correspond to the six simple colors of the spectrum, and its smaller intervals to the intermediate hues formed by the overlapping of those colors. Moreover, the difference in pitch of the same note in higher and lower octaves is analogous to the difference in tint and shade of the several colors which correspond to the notes of the musical scale. Both light and sound, although they exhibit different forms of vibration, are due to two motions at right angles to each other, the motion of direction and the motion of the undulatory substance or matter.

12. Energy (kinetic) comprises the "modes of motion" light, electricity and heat, and force (potential energy) comprises the "modes of motion" gravitation, magnetism and chemism. The unity of energy and force is power, the source of which in our system is the sun, and which is exhibited throughout nature in the action and reaction of bodies and systems of bodies, atomic, molecular or molar.

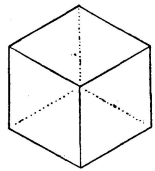
13. Power, as consisting of the opposite activities energy and force, is polar in operation, and hence the associates of these activities are polar, both in radiation of motion and in concentration of form. The several modes of motion which are the expressions of this polar action stand towards each other in certain relations which, with their static and dynamic aspects, may be exhibited schematically by reference to the lines and angles of a cube, as shown in diagram III.

The several relations between the colors of the solar spectrum are also approximately shown by this diagram. The cube, which is the symbol of truth, is based on the square, the fundamental element of which is the right or straight line. Hence, "right action" and conduct "on the square" are expressions of geometrical truth.

PART II.

CUBIC PHILOSOPHY.

14. The cube is best figured for the present purpose by an isomeric projection, in which the three faces enclosed by the black lines represent the three visible sides of a cube, and the three faces enclosed by the dotted lines represent the three unseen sides of the cube; the projection may thus be regarded as a combination of two equal-sided figures.



15. These figures are exhibited in the diagrams V and VI, of which the former represents the three visible sides of the cube, and the latter represents its three unseen sides, only half of each side, however, being subdivided. The numerals placed within the triangular spaces stand for the names of the various factors, the operation of which constitutes the several fields of activity entering into the system of nature, and which fields are marked, on each face of the cubic figure, with the letters A, B and C. In diagram VII all the six sides of the cube are supposed to be represented, (the enclosed spaces becoming equilateral triangles, instead of isosceles triangles as in diagrams V and VI), and it presents a schematic statement of the relations which subsist between the factors which operate throughout the several provinces, six in number, into which nature is divisible. These provinces are as follows: (1) the elemental, (2) the physical, (3) the logical, (4) the physiological, (5) the psy-

chical and (6) the formal. Each of these provinces comprises three parts or fields of operation, which are marked A, B and C respectively on the diagram, and each of these parts consists of three elements, the constituent factors of which are distinguished by the numerals 1, 2, 3 ; 4, 5, 6 ; 7, 8, 9, as in diagrams V and VI. The several provinces are marked by their predominant colors, and each of the factors throughout such provinces are also so marked in diagram VII.

16. In diagram VIII, which is schematically the same as diagram VII, the verbal forms expressive of the various factors of each of the six provinces are exhibited, forming by their relations an organized whole, the parts and elements (with their several constituents) of each province being strictly correspondent to those in the similar positions of each of the other provinces. Hence an analysis of any one province, and an explanation of the relations which subsist between its several parts and elements, and their constituent factors, will furnish data for the explanation of all the provinces and their related activities.

17. Although the six provinces of nature form, as exhibited in diagram VIII, an organized whole, yet they may be arranged in two series of three provinces each, these being specially related among themselves, and the two series standing towards each other in much the same complementary relation as force and energy ; each of which (as stated in Proposition 12) has a threefold manifestation, that is, as atomic, molecular and molar. Nevertheless, this parallel is not perfect, as will be seen by reference to diagrams IX and X, in which the complementary divisions of the six provinces are exhibited ; diagram IX comprising the elemental, the psychical and the logical provinces, and diagram X the physical, the physiological and the formal provinces. Each series comprises what may be described as an atomic, a molecular, and a molar province, but the elemental province which, as corresponding to chemism, is representative of

Diagram V

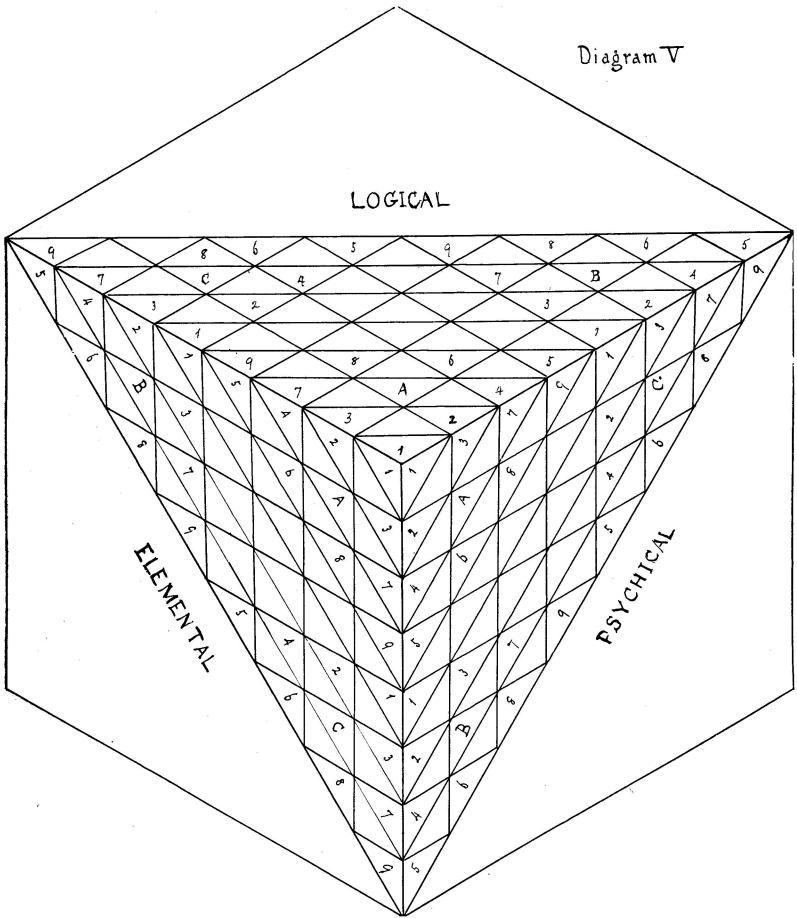
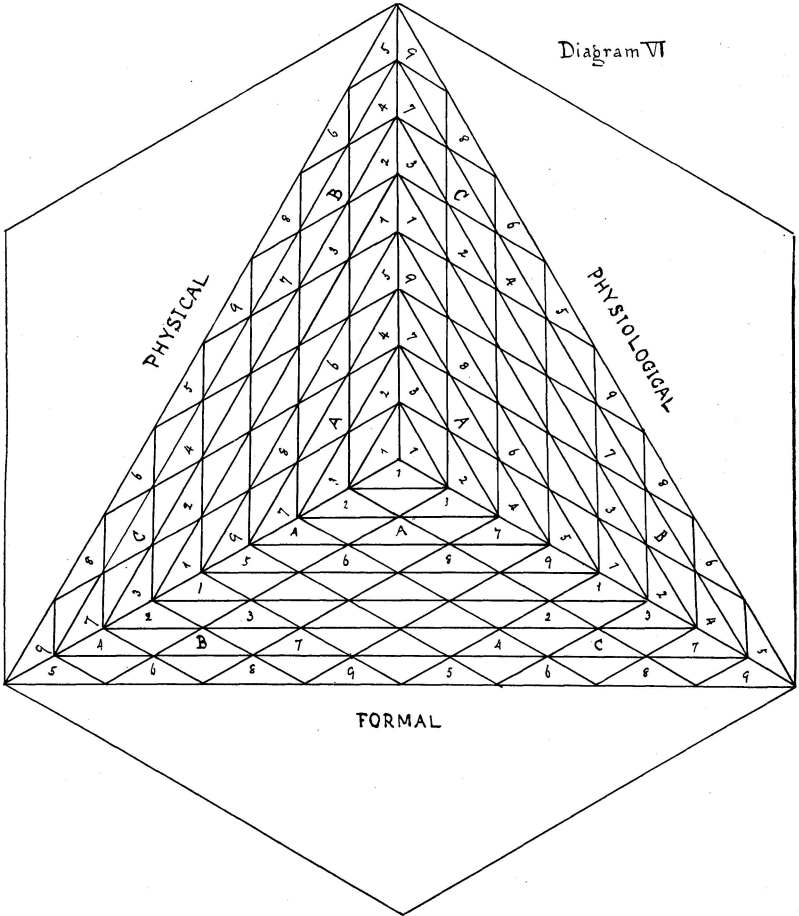


Diagram VI



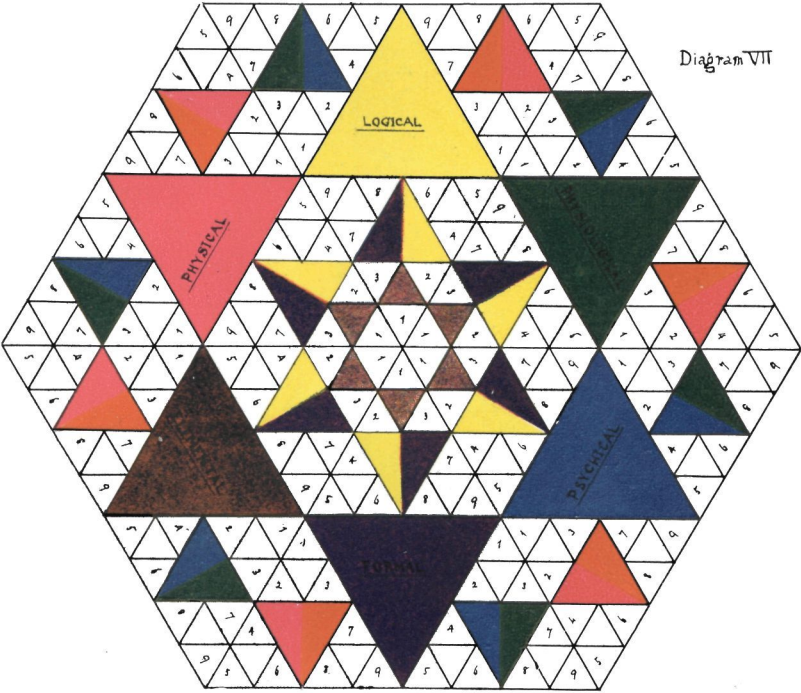


Diagram VII

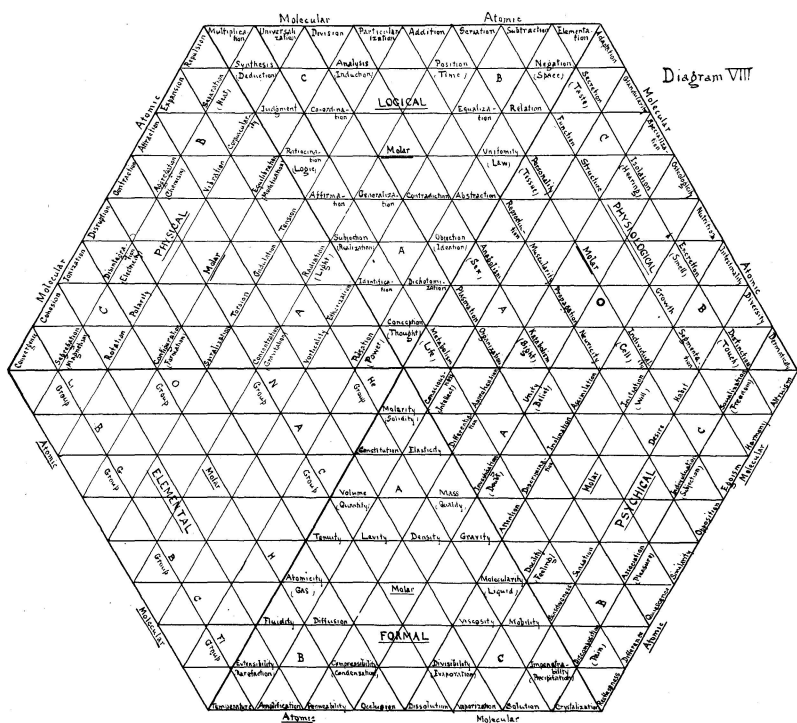
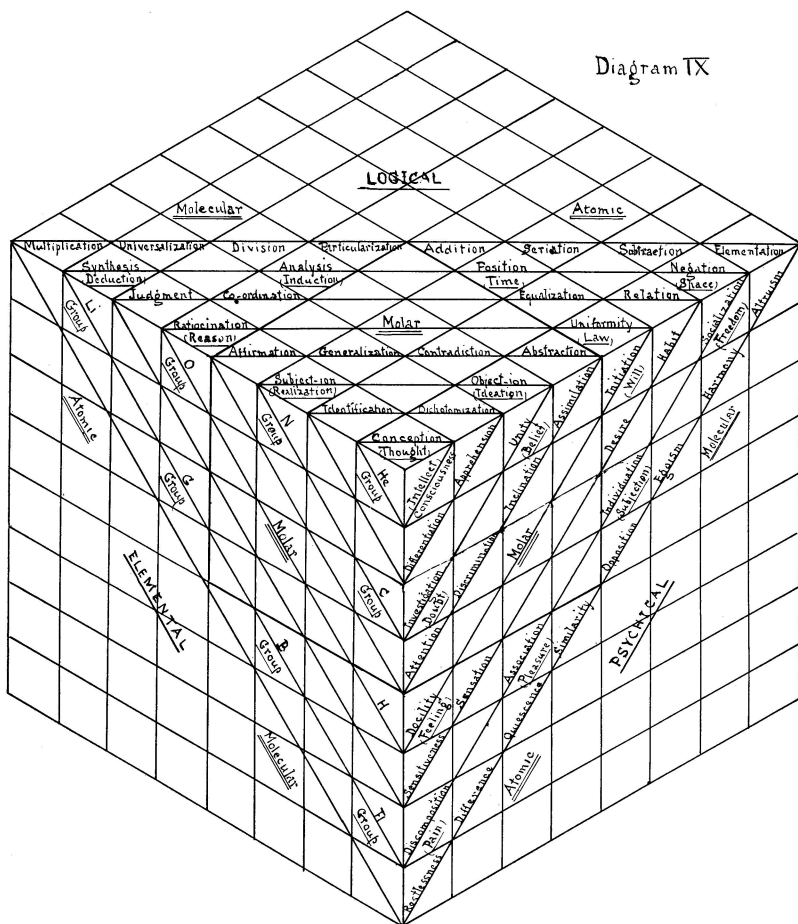


Diagram TX



atomic force, and the physical province, which, as corresponding to heat, is representative of atomic energy, have exchanged places. This is analogous to the division of the solar spectrum, the chief colors of which appear to be divisible into two triads, one consisting of *red*, the color assignable (as shown on diagrams II and VII) to heat, the correspondent of the physical province, *green*, the color assignable to magnetism, the correspondent of the physiological province, and *violet*, the color assignable to gravitation, the correspondent of the formal province; the other color triad being composed of orange, yellow and blue, of which orange is assignable to chemism, the correspondent of the elemental province, yellow is assignable to light, the correspondent of the logical province, and blue is assignable to electricity, the correspondent of the psychical province. Of these colors orange and its related mode of motion, chemism, occupy a peculiar position, however, in relation to the other colors and modes of motion, as stated in proposition 20.

18. In diagram XI we have a representation of the physical province, reproduced from diagram VIII, and a consideration of its various verbal forms under their several aspects, shows the existence of numerous relations among its factors, which furnish a key to the operations of nature, both inorganic and organic, or the invisible and visible, when applied to the other provinces, all of which are strictly correspondent throughout, both structurally and functionally. It is necessary to assume, however, the following fundamental principles:

- (1). The cosmos forms an organized whole throughout.
- (2). Everywhere throughout the cosmic unity there is the rhythmical co-operation of two primeval factors, known by various names, but which may be properly denominated matter and motion, these being always in combination, although sometimes one and sometimes the other preponderates, giving the various separative phenomenal appearances of matter and motion.

Diagram X

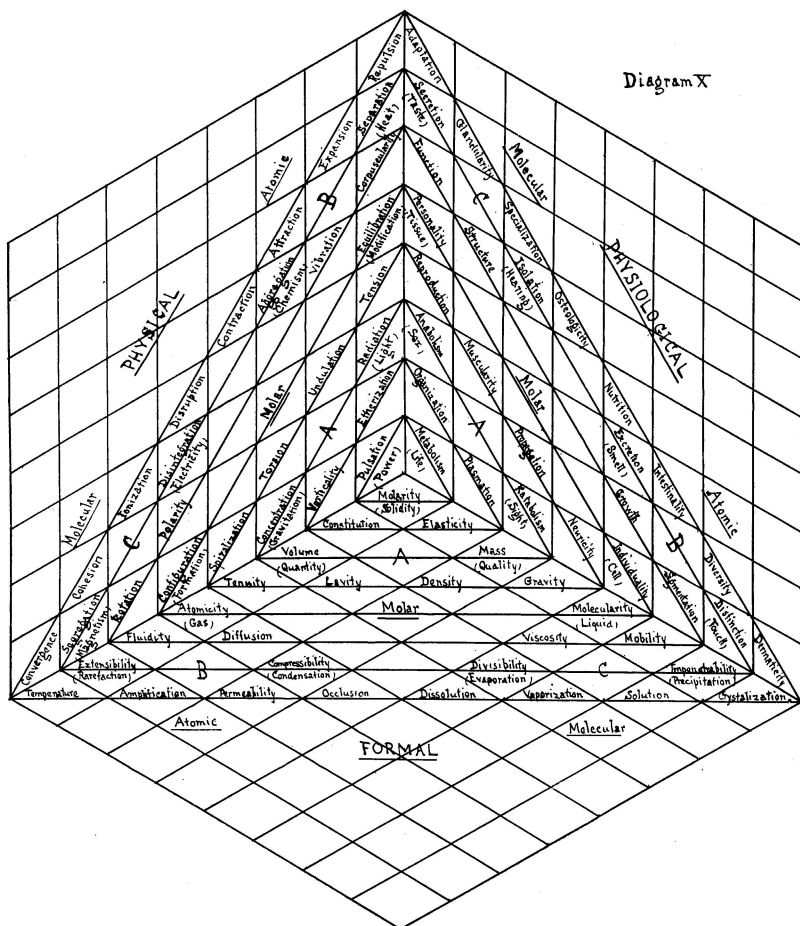
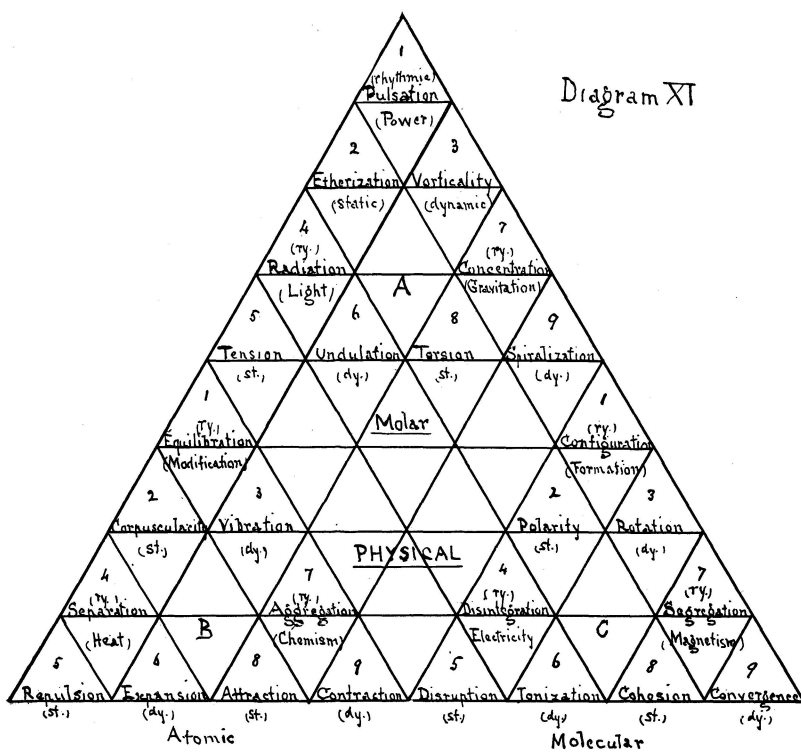


Diagram XI



(3). The rhythm which governs the co-operation of these primeval factors forms a third factor, which is the special representative of cosmic activity; the other two factors exhibiting their action as static and dynamic aspects of particular phases of the rhythmic factor.

(4). The universe as a whole is made up of parts and elements, and its threefold character as whole, parts and elements is exhibited throughout nature both inorganic and organic, and throughout its two primeval factors matter and motion under their various aspects; so that nature and everything in nature is a composition of whole, parts and elements.

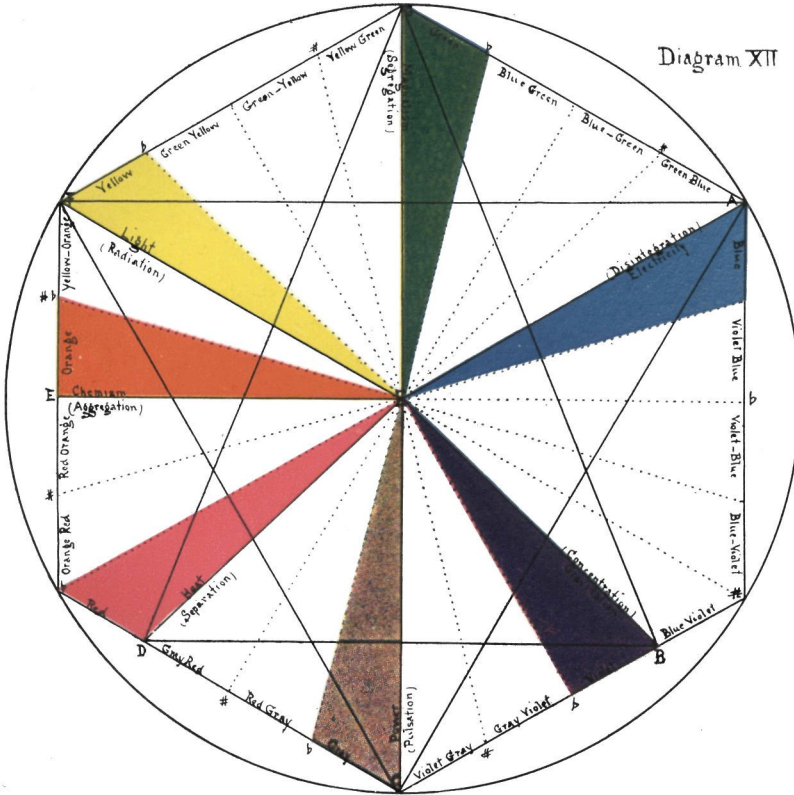
19. In accordance with these fundamental principles, the physical province, as exhibited in diagram XI is an organized molar system of parts and elements, exhibiting its phenomenal activity as matter and motion under various threefold aspects. The several relations thus established are as follows:

(a) The organized whole comprises three parts, or chief fields of operation, marked respectively A, B and C on diagrams VII and XI, which are molar or ethereal, atomic or gaseous and molecular or liquid respectively.

(b) Each part is made up of three elements, the aspects of which are numbered in diagrams V, VI and VII, 1, 2, 3; 4, 5, 6; and 7, 8, 9 respectively; of which 1, 4, 7 are ethereal, 2, 5, 8 are atomic and 3, 6, 9 are molecular. Thus part A, although molar, contains atomic and molecular factors; part B, although atomic, contains molar and molecular factors; and part C, although molecular, contains molar and atomic factors.

(c) Each element is a unit consisting of three factors, which constitute its rhythmic, static and dynamic aspects. The rhythmic factors, which are regulative, are marked with the numbers 1, 4, 7 in each of the parts into which the physical province, as well as each of the other provinces, is divided. as exhibited on diagrams VII and XI, and hence in

Diagram XII



accordance with proposition (*b*) they are ethereal ; the static factors, which are structural or affective, are marked 2, 5, 8, and hence are atomic, and the dynamic factors, which are functional or effective, are marked 3, 6, 9, and hence are molecular.

(*d*) Each element, and therefore each part, is a combination of matter and motion in co-operative activity. The elements whose subordinate factors are numbered 1, 2, 3, respectively in each part, as stated in (*b*), exhibit matter and motion as power in molar equilibrium ; the elements whose subordinate factors are numbered 4, 5, 6 respectively, show a preponderance of motion over matter, constituting them phases of energy ; and the elements whose subordinate factors are numbered 7, 8, 9 respectively show a preponderance of matter over motion, constituting them phases of force.

(*e*) Matter and motion in equilibrium, in part A of diagram XI, are molar, that is ethereal, and have light for their negative activity and gravitation for their positive activity ; in part B, matter and motion are gaseous, as atomic, and have heat for their negative activity and chemism for their positive activity ; while in part C, matter and motion are liquid, as molecular, and have electricity for their negative activity and for their positive activity magnetism.

(*f*) Energy (which, as external, is kinetic) in part A of diagram XI is molar, and exhibits its activity as light ; in part B, energy is atomic and exhibits its activity as heat ; and in part C, energy is molecular and exhibits its activity as electricity. Energy is (motion+matter) that is a combination in which motion predominates over matter.

(*g*) Force (which, as internal, is potential) in part A is molar, and exhibits its activity as gravitation ; in part B, force is atomic and exhibits its activity as chemism ; and in part C, force is molecular and exhibits its activity as magnetism. Force is (matter+motion), that is a combination in which matter predominates over motion.

(*h*) Energy being the negative aspect of power, and force

being the positive aspect of power, diagram XI which represents the physical province of nature, is the exhibition of power under its several molar, atomic and molecular aspects; and all the names or verbal terms which appear on the diagram are expressive of power under its various rhythmic, static and dynamic aspects, as stated in (*c*). Each of the rhythmic aspects of power has two names applied to it, of which one expresses the idea and the other the work actually performed, that is, the reality of power under the particular aspect.

(*i*) Of the rhythmic aspects of power, the ethereal become by analysis atomic and molecular, and the atomic and molecular become by synthesis ethereal. There is a similar relation between the static or structural, that is conditional aspects of power, and also between its dynamic or functional, that is effective aspects. The following are the dynamic aspects of power as stated on diagram XI:

ETHERAL

Vorticality

Undulation (<i>negative</i>)		Spiralization (<i>positive</i>)	
ATOMIC		MOLECULAR	
Vibration		Rotation	
Expansion (<i>n.</i>)	Contraction (<i>p.</i>)	Ionization (<i>n.</i>)	Convergence (<i>p.</i>)

(*k*) As negation is the expression of energy and position is the expression of force, the elements of undulation, which is the dynamic aspect of the molar energy light, are expansion in the atomic field and ionization in the molecular field; and the elements of spiralization, which is the dynamic aspect of molar force (gravitation,) are contraction in the atomic field and convergence in the molecular field. The elements of vibration, as atomic activity, are expansion and contraction, and the elements of rotation, as molecular activity, are ionization and convergence. All these dynamic phases are aspects of vortex motion, depending for their

special character on the material condition, molar, atomic or molecular, under which it operates.

(*L*) The physical province as exhibited in diagram XI, consists of four planes or stages of activity, of which the first or highest (which forms the apex of the triangular figure) may be regarded as solar, that is, ethereal under its molar aspect; the second plane, whose dual activity is light, or molar energy, and gravitation, or molar force, is ethereal; the third plane is atmospheric, that is gaseous and liquid, or atomic and molecular respectively under their molar aspects; and the fourth plane is terrestrial or planetary, as exhibiting atomic and molecular energy and force. Of these several planes, the first and third show the predominance of matter over motion, and the second and fourth show the predominance of motion over matter; but, as the several planes are interdependent and exhibit only power under varying aspects, they form a single system, which is that of a vortex having the sun for its center; so far as our solar system can be treated as a separate system, that is, apart from the vortex of nature as a whole.

19. The physical province, as represented in diagram XI, forms a perfect unity, as all its factors are intimately associated and are co-operative, according to the fields and planes to which they belong; all being, moreover, subordinate to the due action of the whole as an organized system of power. The physical province may be regarded also as a duality, seeing that it is a manifestation of the co-action of matter and motion, under the various phases of force and energy; and further as a tri-unity, as embracing matter under the threefold aspect of ethereal, atomic and molecular, and as exhibiting a threefold activity of energy and also of force in association with the several aspects of matter. Moreover, it is divisible into three parts or fields of operation, each of which is composed of three elements, each consisting of three factors. Finally, it has a ninefold constitution, as it is a composition of nine elements, which represent the

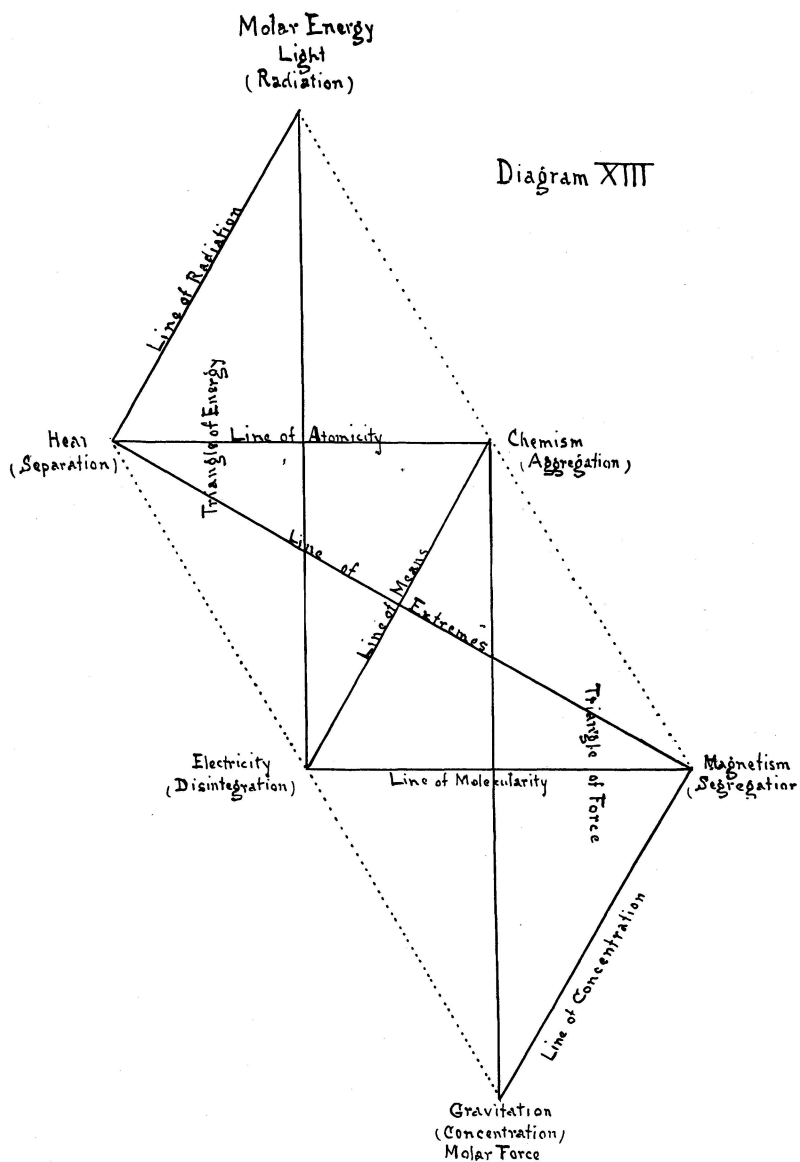
units of the physical world viewed as an organized whole. If unity be added to three, six and nine there contained, we have the perfect numbers four, seven and ten.

20. Color, which may be regarded as a fundamental factor in the phenomena of inorganic nature, and sound, which may be considered as a fundamental factor in the phenomena of organic nature, are, as manifestations of light and gravitation respectively, expressions of energy and force, and they must, therefore, as stated in proposition 10, bear a certain relation to each other. This relation is exhibited diagrammatically on the geometrical spiral in diagram II, and it can be shown also on the lines of a cube. In diagram XII, the cubic projection of which is formed on the same principle as that of diagram VII, the cube is divided into twenty-four sections, as required by proposition 8, and marked with the notes of the musical scale, which are severally assigned the colors of the solar spectrum to which they are respectively particularly related. Moreover, the modes of motion with which the several colors are specially associated are named, thus relating the modes of motion with the notes of the musical scale. Of these notes E occupies a special position, as do also the color and motory factors with which it is associated. E is the connecting note of the musical triads $\overset{F}{\text{ }} \overset{A}{\text{ }} \overset{C}{\text{ }} \underbrace{\hspace{1.5em}}_{\text{E}} \overset{G}{\text{ }} \overset{B}{\text{ }} \overset{D}{\text{ }}$, which are denoted by the crossed triangles of the figure in diagram XII, thus occupying a central position among the notes of the musical scale. In this it corresponds to chemism (whose color is orange), considered as the atomic and central force activity, the position of which, at the equator or equatorial radius of the sphere in diagram II and of the cube in diagram XII, shows it to be most intimately allied to power, as the general activity of nature, the color assigned to which, gray, proclaims its all embracing relations, and whose musical tone C by its upper particles comprises all the tones of the scale. The central activity of chemism justifies its representative note

being marked in the center of the cube of power ; which is agreeable to the fact that the equator is practically an expression of the axis, as this is an extension of the center of the sphere. The color orange may thus be treated as interchangeable with gray, which thus becomes the color of the elemental province of nature.

21. The co-operation of the various factors within the physical universe is governed by the principle of ratio. Reference to this fact, so far as concerns the notes of the musical scale, is made in proposition 8, and it is no less true of the colors of the spectrum, and of the several modes of motion associated with them. Thus, the relation between heat and chemism is ratio-nal, as is also that between electricity and magnetism, and these ratios form a proportion in which chemism and electricity, as the two means, are equal to heat and magnetism, which are the two extremes. This proportion may be extended so as to include the molar activities light and gravitation.

22. The relations between the several modes of motion are further exhibited in diagram XIII, which consists of four equilateral triangles, so arranged that the two center triangles form a parallelogram, of which the upper line is the line of atomicity, having heat at one extremity and chemism at the other extremity ; and the lower line is the line of molecularity, having electricity at one extremity and magnetism at the other extremity. Heat and magnetism form the two extremes and chemism and electricity the two means of a proposition, as stated in proposition 21. The dark line which joins chemism and electricity shows the intimate relation between these two activities, and marks the passage from the atomic to the molecular form of matter. The dark line of the upper triangle is the line of radiation or molar energy, and the triangle formed by this line, the broken line connecting heat and electricity, and the perpendicular joining light and electricity, has the three phases of energy at its angles. The dark line of the lower-



most triangle is the line of concentration or molar force, and the triangle formed by this line, the broken line connecting magnetism and chemism, and the perpendicular joining chemism and gravitation, has at its angles the three phases of force. Thus, molar energy or light, and molar force or gravitation, occupy the angles at the two extremes of the figure, and the two extreme equilateral triangles with their contents are equal to the two mean equilateral triangles and their contents.

PART III.

ORGANIC PHILOSOPHY.

23. The principles affirmed in the foregoing propositions in relation to the physical province of the system of organic nature, as exhibited in diagram XI, are applicable no less to all the other provinces belonging to that system, in accordance with proposition 15. Each province constitutes an organized whole, having parts and elements corresponding throughout to those of the physical province, of which the other provinces may be considered as manifestations under the conditions, elemental, physiological, psychical, logical and formal, presented by those several provinces. Such correspondences are expressed by the terms or verbal symbols set forth in Table A.

TABLE A.

1 ELEMENTAL. ETHERAL (MOLAR).	2 PHYSICAL. ETHERAL (MOLAR).	3 LOGICAL. ETHERAL (MOLAR).	4 PHYSIOLOGICAL. ETHERAL (MOLAR).	5 PSYCHICAL. ETHERAL (MOLAR).	6 FORMAL. ETHERAL (MOLAR).
	<i>Power.</i>	<i>Thought.</i>	<i>Life.</i>	<i>Intellect.</i>	<i>Solidity.</i>
1 He group.	Pulsation (<i>ry</i>).....	Conception.....	Metabolism.....	Consciousness.....	Molarity.
2	Etherization (<i>st</i>).....	Dichotomization.....	Organization.....	Differentiation.....	Constitution.
3	Vorticality (<i>dy</i>).....	Identification.....	Plasmation.....	Apprehension.....	Elasticity.
	<i>Light.</i>	<i>Ideation.</i>	<i>Sight.</i>	<i>Doubt.</i>	<i>Quantity.</i>
A 4 N group.	Radiation (<i>ry</i>).....	Objection.....	Katabolism.....	Investigation.....	Volume.
5	Tension (<i>st</i>).....	Abstraction.....	Neuricity.....	Attention.....	Tenuity.
6	Undulation (<i>dy</i>).....	Contradiction.....	Propagation.....	Discrimination.....	Levity.
	<i>Gravitation.</i>	<i>Realization.</i>	<i>Sex.</i>	<i>Belief.</i>	<i>Quality.</i>
7 C group.	Concentration (<i>ry</i>)...	Subjection.....	Anabolism.....	Unity.....	Mass.
8	Torsion (<i>st</i>).....	Generalization.....	Muscularity.....	Inclination.....	Density.
9	Spiralization (<i>dy</i>).....	Affirmation.....	Reproduction.....	Assimilation.....	Gravity.
ATOMIC.	ATOMIC.	ATOMIC.	ATOMIC.	ATOMIC.	ATOMIC.
	<i>Modification.</i>	<i>Law.</i>	<i>Cell.</i>	<i>Feeling.</i>	<i>Gas.</i>
1 O group.	Equilibration (<i>ry</i>)....	Uniformity.....	Individuality.....	Docility.....	Atomicity.
2	Corpuscularity (<i>st</i>)..	Relation.....	Segmentation.....	Sensitiveness.....	Fluidity.
3	Vibration (<i>dy</i>).....	Equalization.....	Growth.....	Sensation.....	Diffusion.
	<i>Heat.</i>	<i>Space.</i>	<i>Touch.</i>	<i>Pain.</i>	<i>Rarefaction.</i>
B 4 Li group.	Separation (<i>ry</i>).....	Negation.....	Distinction.....	Discomposition.....	Extensibility.
5	Repulsion (<i>st</i>).....	Elementation.....	Dermaticity.....	Restlessness.....	Temperature.
6	Expansion (<i>dy</i>).....	Subtraction.....	Diversity.....	Difference.....	Amplification.
	<i>Chemism.</i>	<i>Time.</i>	<i>Smell.</i>	<i>Pleasure.</i>	<i>Condensation.</i>
7 G group.	Aggregation (<i>ry</i>)..	Position.....	Excretion.....	Association.....	Compressibility.
8	Attraction (<i>st</i>).....	Seriation.....	Intestinality.....	Quiescence.....	Permeability.
9	Contraction (<i>dy</i>)....	Addition.....	Nutrition.....	Similarity.....	Occlusion.

TABLE A (Continued).

1 ELEMENTAL. MOLECULAR.	2 PHYSICAL. MOLECULAR.	3 LOGICAL. MOLECULAR.	4 PHYSIOLOGICAL. MOLECULAR.	5 PSYCHICAL, MOLECULAR.	6 FORMAL. MOLECULAR.
	<i>Formation.</i>	<i>Logic.</i>	<i>Tissue.</i>	<i>Will.</i>	<i>Liquid.</i>
1 H	Configuration (<i>ry</i>)....	Ratiocination.....	Personality.....	Initiation	Molecularity.
2	Polarity (<i>st</i>).....	Co-ordination	Structure.....	Desire.....	Viscosity.
3	Rotation (<i>dy</i>).....	Judgment	Function.....	Habit.....	Mobility.
	<i>Electricity.</i>	<i>Induction.</i>	<i>Hearing.</i>	<i>Subjection.</i>	<i>Evaporation.</i>
C 4 B group.	Disintegration (<i>ry</i>)...	Analysis.....	Isolation.....	Individuation	Divisibility.
5	Disruption (<i>st</i>).....	Particularization.....	Osteologicity.....	Opposition.....	Dissolution.
6	Ionization (<i>dy</i>).....	Division.....	Specialization.....	Egoism.....	Vaporization.
	<i>Magnetism.</i>	<i>Deduction.</i>	<i>Taste.</i>	<i>Freedom.</i>	<i>Precipitation.</i>
7 Fl group.	Segregation (<i>ry</i>)....	Synthesis.....	Secretion.....	Socialization.....	Impenetrability.
8	Cohesion (<i>st</i>).....	Universalization.....	Glandularity.....	Harmony.....	Solution.
9	Convergence (<i>dy</i>)....	Multiplication.....	Adaptation.....	Altruism.....	Crystallization.

TABLE B.

PROVINCES.

- | | |
|---------------|-------------------|
| 1. Elemental. | 2. Physical. |
| 3. Logical. | 4. Physiological. |
| 5. Psychical. | 6. Formal. |

PART I.

RHYTHMIC (ETHERAL). MOLAR.

Prov.	Idea.	Reality.	Static Aspect.	Dynamic Aspect.
1	He group.			
2	Power.....	Pulsation.....	Etherization.....	Vorticality.
3	Thought.....	Conception.....	Dichotomization.....	Identification.
4	Life.....	Metabolism.....	Organization.....	Plasmation.
5	Intellect.....	Consciousness.....	Differentiation.....	Apprehension.
6	Solidity.....	Molarity.....	Constitution.....	Elasticity.

ATOMIC.

MOLECULAR.

Prov.	Idea.	Reality.	Static Aspect.	Dynamic Aspect.	Prov.	Idea.	Reality.	Static Aspect.	Dynamic Aspect.
1	O group.				1	H.			
2	Modification....	Equilibration....	Corpuscularity.....	Vibration.....	2	Formation.....	Configuration...	Polarity.....	Rotation.
3	Law.....	Uniformity.....	Relation.....	Equalization.....	3	Logic.....	Ratiocination....	Co-ordination.....	Judgment.
4	Cell.....	Individuality.....	Segmentation.....	Growth.....	4	Tissue.....	Personality.....	Structure.....	Function.
5	Feeling.....	Docility.....	Sensitiveness.....	Sensation.....	5	Will.....	Initiation.....	Desire.....	Habit.
6	Gas.....	Atomicity.....	Fluidity.....	Diffusion.....	6	Liquid.....	Molecularity.....	Viscosity.....	Mobility.

PART II.

ENERGY (NEGATIVE).

FORCE (POSITIVE).

MOLAR (ETHERAL).

MOLAR (ETHERAL).

Prov.	Idea.	Reality	Static Aspect.	Dynamic Aspect.	Prov.	Idea.	Reality.	Static Aspect.	Dynamic Aspect.
1	N. group.				1	C group.			
2	Light	Radiation.....	Tension.....	Undulation.....	2	Gravitation.....	Concentration...	Torsion.....	Spiralization.
3	Ideation.....	Objection.....	Abstraction.....	Contradiction...	3	Realization.....	Subjection.....	Generalization.....	Affirmation.
4	Sight.....	Katabolism.....	Neuricity.....	Propagation.....	4	Sex.....	Anabolism.....	Muscularity.....	Reproduction.
5	Doubt.....	Investigation.....	Attention.....	Discrimination...	5	Belief.....	Unity.....	Inclination.....	Assimilation.
6	Quantity.....	Volume.....	Tenuity.....	Levity.....	6	Quality.....	Mass.....	Density.....	Gravity.

ATOMIC.

ATOMIC.

1	Li Group.				1	G group.			
2	Heat	Separation.....	Repulsion.....	Expansion.....	2	Chemism.....	Aggregation	Attraction	Contraction.
3	Space.....	Negation.....	Elementation.....	Subtraction.....	3	Time.....	Position.....	Seriation.....	Addition.
4	Touch.....	Distinction.....	Dermaticity.....	Diversity.....	4	Smell.....	Excretion.....	Intestinality.....	Nutrition.
5	Pain.....	Discomposition.....	Restlessness.....	Difference.....	5	Pleasure.....	Association.....	Quiescence.....	Similarity.
6	Rarefaction.....	Extensibility.....	Temperature.....	Amplification.....	6	Condensation.....	Compressibility	Permeability.....	Occlusion.

MOLECULAR.

MOLECULAR.

1	B group.				1	F group.			
2	Electricity.....	Disintegration...	Disruption.....	Ionization.....	2	Magnetism.....	Segregation	Cohesion	Convergence.
3	Induction.....	Analysis.....	Particularization...	Division.....	3	Deduction	Synthesis.....	Universalization.....	Multiplication.
4	Hearing.....	Isolation.....	Osteologicity.....	Specialization...	4	Taste.....	Secretion.....	Glandularity.....	Adaptation.
5	Subjection.....	Individuation.....	Opposition.....	Egoism.....	5	Freedom.....	Socialization.....	Harmony.....	Altruism.
6	Evaporation.....	Divisibility.....	Dissolution.....	Vaporization.....	6	Precipitation ..	Impenetrability	Solution.....	Crystallization.

24. In table B are given the same particulars as in table A, but arranged so as to bring together the various constituent factors which are correspondents in the several provinces; the first part giving the rhythmic or ethereal factors throughout the molar, atomic and molecular fields, and the succeeding part giving the molar, atomic and molecular factors which express the negative and positive manifestations of energy and force throughout those fields.

25. Although the six provinces which compose the system of organic nature are separable in thought as though distinct, yet in reality they are not merely intimately associated but are interdependent. They exist apart only as varying expressions of the common underlying activity, and this applies to the several parts and elements of which each province is constituted and their rhythmic, static and dynamic factors; the various terms which in the related fields of the several provinces are correspondents being merely different names for varying aspects of a common factor manifesting itself on different planes.

26. Diagram VIII must be regarded as representing the organic whole, not at its first inception, but at its present advanced stage of development. It has passed through various stages of progress, as required by the theory of evolution, which progress has depended on the existence within the organism of the three physical fields A, B, C respectively, and on the co-operation of the two opposing motory factors, radiation, which is the actuality of the molar energy light, and concentration, which is the actuality of the molar force gravitation; these two activities operating throughout each of the three fields of matter, appearing as the six modes of motion, two of these belonging to each of such fields, all of them, however, being manifestations of the power which constitutes the unity of nature. Evolution is the result of the interaction of these various activities, and it appears phenomenally as emergence of a higher or more complex factor or system of factors, through the union

of two or more lower or less complex factors or systems of factors. Thus in the physical province the field A must be considered as emergent out of the co-action of the fields B and C; and within these fields the unity composed of the several factors marked in diagram VII by the numerals 1, 2, 3, must be considered as emergent out of the co-action of the unities composed of the several factors numbered 4, 5, 6 and 7, 8, 9 respectively. The same is true also of all the other provinces of organic nature.

27. Of these provinces, three are manifestations especially of force (that is, matter + motion) and three of energy (that is motion + matter), the distinction between which pervades the whole of organic nature; although, as representative respectively of matter and of motion, they are always combined in complementary opposition throughout all the fields of activity comprised in those provinces. Moreover, that distinction is exhibited among the different planes of life, the plant organism, as the embodiment of energy, being radiative, and the animal organism, as the embodiment of force, being concentrative. The higher life of man, however, which is on the mental plane, is radiative, and thus expressive of energy, although the human organism, being animal, is expressive of force. Both radiation and concentration are operative, however, throughout all the provinces of organic nature; and such may be said also of universal nature, although the inorganic world, as predominately concentrative, is a manifestation of force especially, and the organic world, as predominately radiative, is a manifestation particularly of energy.

28. In the organic world the female is the special embodiment of the internal activity force, and the male is the special embodiment of the external activity energy. Hence, in the human species, woman represents the material form of the organism and man, as motory, represents its functional activity. But as matter and motion are inseparable, exhibiting themselves as force and energy throughout all the pro-

ORGANIC PHILOSOPHY.

vines of nature, both man and woman must embody both force and energy and therefore possess both male and female factors in some degree, although in man the former principle predominates and in woman the latter principle is dominant.

29. As the female is expressive particularly of force and the male of energy, and as these activities are always co-operative, man and woman must stand towards each other in a complementary polar radiation, the former showing on the several planes of his being the radiative activity characteristic of light, heat and electricity, and the latter the concentrative action characteristic of gravitation, chemism and magnetism. That polar relation is exhibited in diagram XIV, showing a double triangle within a cube, the triangle which points downwards representing by its three angles or sides the three force factors in the physical province, with their physiological correspondents, and therefore exhibiting the dominating female characteristics; and the triangle which points upwards representing the three energy factors in the physical province and their physiological factors, and therefore exhibiting the particular male characteristics. The central figure within the two triangles stands for the rhythmic principle that combines them as an organic whole, which is male or female according to whether it is controlled by the attributes of force or by those of energy.

30. Man and woman thus stand at the two opposite poles of organic existence, the former at the negative or radiative pole, and the latter at the positive or concentrative pole. Hence, while man is the chief embodiment of neuricity, with the function of sight as its chief physiological activity, the dynamic aspect of which is propagation, and answering to light on the physical plane, with undulation as its dynamic aspect; woman is the chief embodiment of muscularity with the function of sex as its chief physiological activity, the dynamic aspect of which is reproduction, and corresponding to gravitation on the physical plane, with spiralization as its dynamic aspect. Sight and sex are molar

in their character, that is, they affect the whole organism, but each has its representatives in the atomic and molecular fields. Thus the atomic representative of sight is touch, whose reality is distinction, and its dynamic aspect diversity; the molecular representative of sight being hearing, the reality of which is isolation and its dynamic aspect specialization, which sensory functions are therefore more highly developed in man than in woman. On the other hand, the atomic representative of sex is smell, the reality of which is excretion and its dynamic aspect nutrition; the molecular representative of sex being taste, the reality of which is secretion and its dynamic aspect adaptation, which sensory functions are more highly developed in woman than in man.

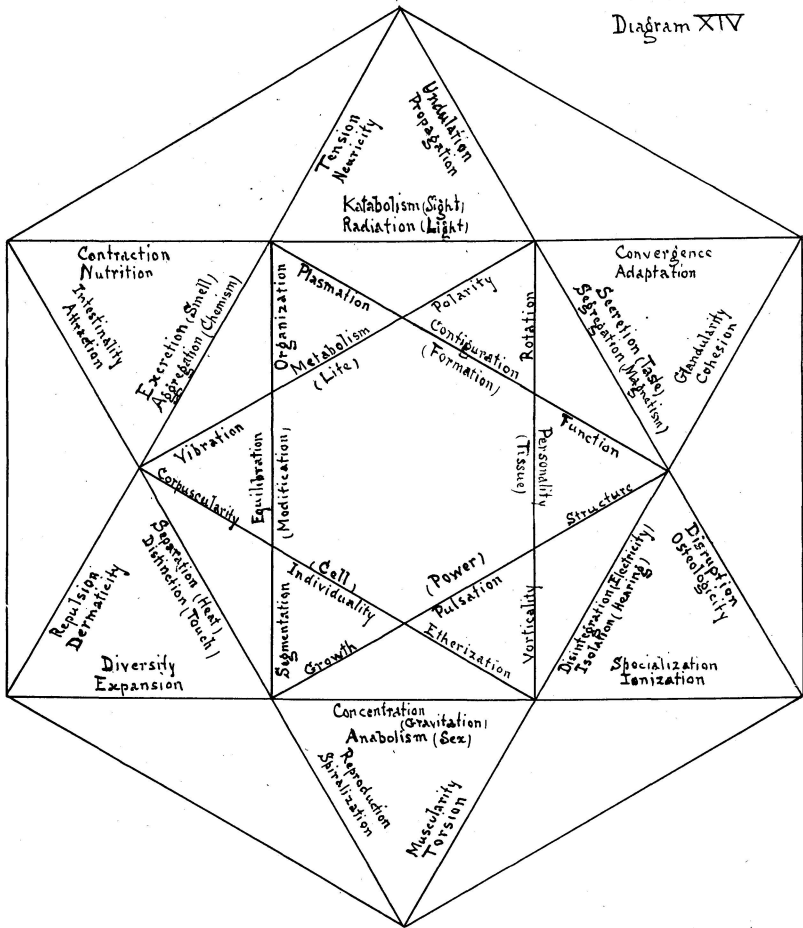
31. The psychical province, the representation of which forms part of the figure given in diagram VIII, is reproduced in diagram XV, consideration of the radiative factors in which shows that the chief psychical characteristic of man is doubt, the reality of which is investigation and its dynamic aspect discrimination; doubt being represented in the atomic field by pain, that is discomposition, whose dynamic aspect is difference, and in the molecular field by subjection, that is individuation, whose dynamic aspect is egoism. Woman, on the other hand, is characterized by belief, the reality of which is unity and its dynamic aspect assimilation; belief being represented in the atomic field by pleasure, that is association, the dynamic aspect of which is similarity, and in the molecular field by freedom, the reality of which is socialization and its dynamic aspect altruism. According to this summary, woman might be regarded as being more advanced psychically than man, socialization with altruistic harmony being the highest ethical aim of human life. But such is not the case; as man also reaches this ethical result and the more certainly than woman, seeing that his conclusions are arrived at as the outcome of intellectual investigation, and not through simple assimilation of what appeals

to inclination, which is the usual source of woman's belief. Language as a method of organic expression belongs particularly to woman, but as an instrument of analysis belongs more especially to man. The mental difference between man and woman is summed up in the fact, that while the former is essentially analytic in his mental action, induction being his chief distinctive logical faculty, the latter is essentially synthetic, her chief distinctive logical faculty being deduction; these being the opposing complementary expressions, in the ethical field, of the thought conception which man and woman possess in common.

32. The complementary opposition between male and female, as above described, operates throughout the whole of organic nature (although not so prominently as between man and woman), and in varying degrees on the different planes of life. This is exhibited in diagram XVI, which consists of one side of a cube in perspective, the upper half of which is divided into a series of triangles, one within another, of which the left leg represents energy and therefore is expressive of the special male psychological characteristic, and the right leg represents force and therefore is expressive of the special female psychological characteristic. This applies to all the planes of organic nature, in its different stages of evolution, the attribute which is most strongly developed on each being shown by the thick line of the triangles; which occurs on the energy side in man alone. The combination of the two sides of the woman's triangle reaching that of man shows, however, that she is capable under special conditions of attaining to mental equality with man; who sometimes, however, as shown by the extension of the sides of his triangle beyond the ordinary human plane, attains to special prominence. Similarly, on the lower organic planes, advance may, under special conditions, be made beyond the ordinary development of particular races or individuals, a fact which is denoted in the diagram by the upward extension of the legs of the several triangles.

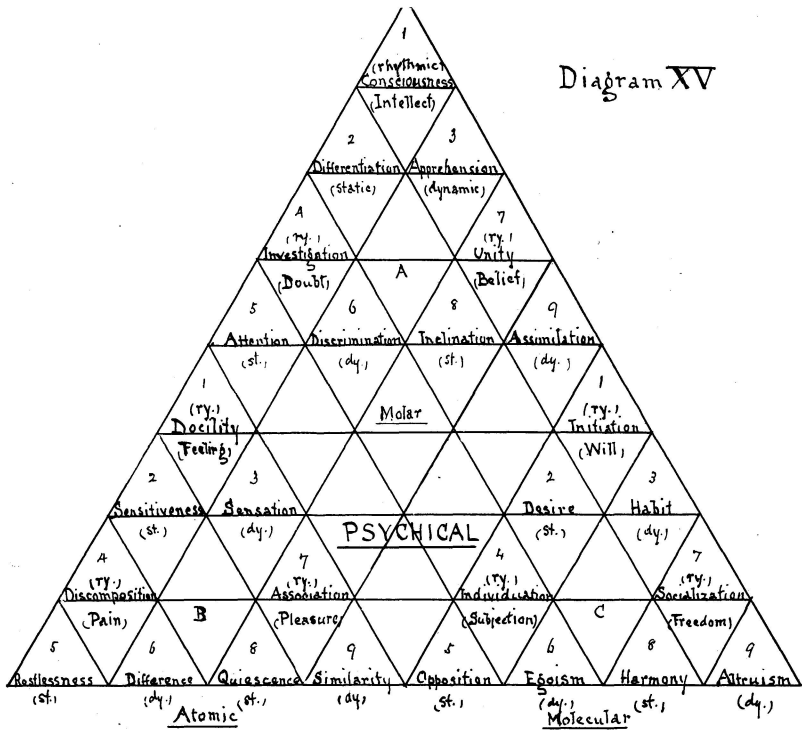
Male (Negative)

Diagram XIV



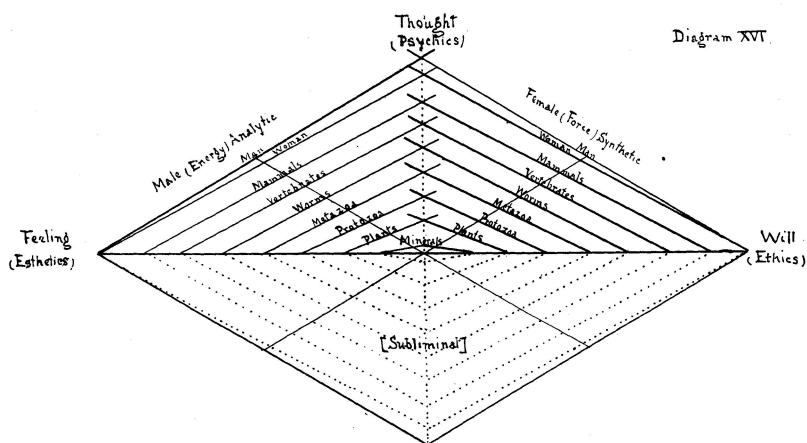
Female (Positive)

Diagram XV



33. Mankind is animal so far as concerns organic structure, which is the expression of the principle of concentration, and human so far as regards mental action, which is an expression of the principle of radiation. On the mental plane man exhibits all the luxuriant diversity which the operation of light (radiation) gives to plant life. This dominance of energy affects all the fields of human activity, and manifests itself on all the planes of human existence. Gradually neuricity supersedes muscularity as the controlling organic factor, and functionally, therefore, man becomes creative rather than procreative, which is the chief function of animal life. Hence, creation is the distinctive outcome of human life and it is operative in thought, word and deed, resulting in the development and cultivation of the various fields of mental activity, intellectual, esthetic and ethic, marked by the diverse phases of science, art and conduct, and particularly by the language and symbols which constitute the instrument of rational thought. Logically, human progress is due to the action of mental induction (analysis) which is essential to, as giving a proper basis for, deduction (synthesis); this, as an independent process, belonging to the early stage of mental action marked by the activity of the imagination. Analysis is the logical expression of segmentation, as synthesis is that of integration, and thus they represent the fundamental operations of progress. Hence, refination, which is the mark of progress, is the first and last word in evolution. It depends, however, on the rhythmic operation of the principle of ratio, which finally exhibits itself as ratio-cination or logical reasoning. Evolution, thus, is refination, under the guidance of rationality, and its highest aspect is spirituality, which is the ethical outcome of human progress, exhibiting itself as altruistic freedom on the human plane and as religious aspiration on the cosmic plane.

34. Mankind, coming last in the phenomenal procession of organic nature, takes the lead in the return to the primal



source of power, in which the physical, organic and mental activities originated, and of which phenomenal nature is the projection. Here cosmic being realizes itself, finally becoming self-conscious through man and thus fulfilling the aim of evolution. Out of the formless, unconscious individuality of nature has been developed, perhaps through many eons of evolution, the formal, conscious personality to which the term "God" is applied ; clothed with the ethereal garment woven throughout the ages by the experiences of all organic existences, and transformed by the mental, moral and spiritual activity of mankind, whose reason as the intelligence of radiative thought has become the concentrated intelligence of cosmic intuition.

